

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : BIOTECHNOLOGY
Name/s of the Faculty : Dr. S. JAYASHREE
Course Title : BIOCHEMISTRY
Course Code : 23BY/PC/BC14
Shift : II

COURSE OUTCOMES (COs)

| COs | Description | CL |
|------------|--|-----------|
| CO1 | define the principles of biochemistry | K1 |
| CO2 | explain the structure, function, and regulation of biomolecules in biological processes | K2 |
| CO3 | present the underlying relationship between biomolecules for homeostasis of body functions | K3 |
| CO4 | outline the importance of metabolic pathways and enzymes involved | K4-K5 |
| CO5 | integrate biomolecules in various fields of science and research | K6 |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|-------------------------------|-----------------|--|------------------------|-----------------------|------------|--------------------------------------|---------------------------|
| Jun 22, 2026 (Day Order 6) | 1 | Biological Foundation of Biochemistry 1.1 Water- Properties, Role of water | K1-K5 | 2 | 1-4 | PowerPoint presentation | MCQ |

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|---|---|---|-------|-----|-----|-------------------------|--|
| Jun 23 – July 1, 2026 (Day Order 1- 6) | 1 | Biological Foundation of Biochemistry 1.1 Water- Properties, Role of water | K1-K5 | 1 | 1-4 | PowerPoint presentation | Group Discussion |
| | | 1.2 Maintenance of Body Fluids in Various Body Compartments and Related Disorders pH- Buffers, Maintenance of pH – Role of Hemoglobin, Respiratory Control, Role of Kidney | K1-K4 | 3 | 1-4 | | |
| | | K2-K6 | 1 | 2-5 | | | |
| July 2 – July 8, 2026 (Day Order 1- 6) | 1 | 1.3 pH- Buffers, Maintenance of pH - Role of Hemoglobin, Respiratory Control, Role of Kidney | K2-K6 | 2 | 2-5 | PowerPoint presentation | Third Component I Case analysis on body fluid and pH – 20 marks |
| | | 1.4 Acidosis, Alkalosis | K3-K6 | 2 | 3-5 | | |
| | 2 | Biomolecules 2.1 Carbohydrates Biological importance, Classification, Monosaccharides, Hemiketal and Hemiacetal Formation, Anomers, Epimers | K1-K4 | 1 | 1-4 | | Quiz |
| July 9 – 16, 2026 (Day Order 1- 6) | 2 | Biomolecules 2.1 Carbohydrates Biological importance, Classification, | K1-K4 | 2 | 1-4 | PowerPoint presentation | Open book test |

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|--|----------------------|---|-------|---|-----|----------------------------|---|
| | | Monosaccharides, Hemiketal and Hemiacetal Formation, Anomers, Epimers | | | | | |
| | | 2.2 Disaccharides- Sucrose, Lactose, Polysaccharides - Cellulose, Starch, Glycogen | K2-K4 | 3 | 2-4 | | |
| July 17 – 24, 2026 (Day Order 1- 6) | 2 | 2.3 Proteins – Biological importance, Classification of Aminoacids, Peptide Bonds | K2-K4 | 2 | 2-4 | PowerPoint presentation | Third component - II Model – 10 marks Quiz |
| | | 2.4 Structural Hierarchy of Proteins | K5-K6 | 3 | 5-5 | | |
| July 25 – 28, 2026 (Day Order 1- 3) | 3 | Biomolecules 3.1 Lipids – Biological importance, Types based on structure, Fatty Acids – Types, Nomenclature | K1-K3 | 3 | 1-3 | PowerPoint presentation | Group discussion |
| | | 3.2 Classification- Simple Lipids, Complex Lipids, Derived Lipids | K1-K6 | 1 | 1-5 | PowerPoint presentation | |
| July 29 – Aug 3, 2026 | C.A. Test - I | | | | | | |

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| Aug 4 - 6, 2026 (Day Order 4 - 6) | 3 | Biomolecules 3.2 Classification- Simple Lipids, Complex Lipids, Derived Lipids | K1-K6 | 1 | 1-5 | PowerPoint presentation | Group discussion |
| Aug 7 – 14, 2026 (Day Order 1- 6) | 3 | 3.3 Nucleic Acids Biological Importance, Structures of Purine and Pyrimidines | K2-K6 | 3 | 2-5 | PowerPoint presentation | Presentation |
| | | 3.4 Nucleosides and Nucleotides, DNA Structural Organization | K2-K6 | 2 | 2-5 | | Group discussion |
| Aug 17 - 24, 2026 (Day Order 1- 6) | 3 | 3.4 Nucleosides and Nucleotides, DNA Structural Organization | K2-K6 | 1 | 2-5 | PowerPoint Presentation | Test (short answers) |
| | 4 | Cellular Metabolism 4.1 Concepts of Metabolism- Glycolysis, Pentose Phosphate Pathway, Citric Acid Cycle | K1-K6 | 4 | 1-5 | Case studies | Group discussion |
| Aug 25 – Sep 2, 2026 (Day Order 1- 6) | 4 | 4.2 Respiratory Chain and Oxidative Phosphorylation | K2-K5 | 3 | 2-4 | PowerPoint Presentation | Test (short answers) |
| | | 4.3 Oxidation and Biosynthesis Fatty | K3-K5 | 2 | 3-4 | Case studies | Group discussion |

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| | | Acids, Urea Cycle | | | | | |
| Sep 3 – 11, 2026 (Day Order 1- 6) | 4 | 4.3 Oxidation and Biosynthesis Fatty acids, Urea Cycle | K3-K5 | 2 | 3-4 | PowerPoint presentation | Third component - III Assignment – 20 marks |
| | | 4.4 Synthesis and Catabolism – Purines and Pyrimidines | K4-K6 | 3 | 4-5 | Model building | Discussion |
| Sep 15-17, 2026 (Day Order 1 - 3) | 4 | 4.4 Synthesis and Catabolism – Purines and Pyrimidines | K4-K6 | 2 | 4-5 | PowerPoint presentation | Case studies |
| | 5 | 5.1 Enzyme Nomenclature, Classification, Cofactor, Active Site, Specificity and Factors Affecting Enzyme Action | K1-K6 | 2 | 1-5 | Model building | Quiz |
| Sep 18 –23, 2026 | C.A. Test - II | | | | | | |
| Sep 24 - 28, 2026 (Day 4 – 6) | 5 | 5.1 Enzyme Nomenclature, Classification, Cofactor, Active Site, Specificity and Factors Affecting Enzyme Action | K1-K6 | 2 | 1-5 | Model building | Quiz |

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|---|-----------------|---|-------|---|-----|-------------------------|----------------------|
| Sep 29 – Oct 7, 2026 (Day Order 1 - 6) | 5 | 5.1 Enzyme Nomenclature, Classification, Cofactor, Active Site, Specificity and Factors Affecting Enzyme Action | K1-K6 | 1 | 1-5 | PowerPoint Presentation | Test (short answers) |
| | | 5.2 Enzyme Regulation Enzyme inhibition (Competitive inhibition, Uncompetitive inhibition) | K2-K5 | 4 | 2-4 | Model building | Quiz |
| Oct 8 - 14, 2026 (Day Order 1 - 6) | 5 | 5.3 Control of Enzyme Quantity, Altering the Catalytic Efficiency of the Enzyme | K2-K5 | 3 | 2-4 | PowerPoint presentation | Group discussion |
| | | 5.4 Enzymes in Clinical Diagnosis and Pharmaceutical Industries | K2-K6 | 2 | 2-5 | Case studies | Case Studies |
| Oct 15 - 21, 2026 (Day Order 1- 4) | REVISION | | | | | | |

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : **Biotechnology**
Name of the Faculty : **Dr. K. Veena Gayathri**
Course Title : **Microbiology**
Course Code : **23BY/PC/MI14**
Shift : **II**

COURSE OUTCOMES (COs)

| COs | Description | CL |
|------------|--|-----------|
| CO1 | To establish knowledge on morphology and classification of microbes | K1, K2 |
| CO2 | To explicit learning on microscopic techniques and culturing methods | K3 |
| CO3 | To comprehend the nutritional requirement, growth pattern and preservation of microbes | K4 |
| CO4 | To demonstrate the understanding on the causes of Microbial Diseases, their control and prevention | K5 |
| CO5 | To appreciate extremophiles and various applications of microbes | K6 |
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| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|---------------------------------------|-----------------|------------------------|------------------------|-----------------------|------------|--------------------------------------|---------------------------|
| Jun 15 – 22, 2026 (Day Order 1- 6) | 1 | Introduction to | K1-K2 | 5 | 1 | Presentation | Assignments |

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|---|---|--|----------|---|--------|--|---------------|
| | | Microbiology 1.1 History of Microbiology- Scope, Evolution Criteria for Classification - Taxometrics, Bacterial typing | | | | | |
| Jun 23 – July 1, 2026 (Day Order 1- 6) | 1 | 1.2 Numerical Taxonomy; Chemotaxonomy Phylogenetic Relationships - Cladogram, Dendrogram, Universal Phylogenetic Trees | K1-K2 | 3 | 1 | Case analysis with mathematical problems | Questionnaire |
| | | 1.3 Microscopy – Principles and Applications of Bright Field, Dark Field, Phase Contrast | K1-3, K6 | 2 | 1-2, 5 | Lab Demonstration | Tests |
| July 2 – July 8, 2026 (Day Order 1- 6) | 2 | 1.4 Principles and Applications of Fluorescent and Electron Microscopy | K1-3, K6 | 5 | 1-4 | Presentation/ Blackboard | Tests |
| July 9 – 16, 2026 (Day Order 1- 6) | 2 | Microbial | | | | | |

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|--|----------------------|--|-------|---|-----|---|------------|
| | | Classification | K1-K5 | 3 | 1-4 | Presentation | Tests |
| | | 2.1 Classification of Bacteria | | | | | |
| | | 2.2 Classification of Fungi – General Properties – Reproduction | K1-K5 | 2 | 1-4 | Presentation | Tests |
| July 17 – 24, 2026 (Day Order 1- 6) | 2 | 2.2 Classification of Fungi – General Properties – Reproduction | K1-K5 | 2 | 1-4 | Presentation | Tests |
| | | 2.3 Classification of Viruses - General Properties – Multiplication – Reproduction | K1-K5 | 3 | | | |
| July 25 – 28, 2026 (Day Order 1- 3) | 3 | 2.4 Classification of Algae | K1-K5 | 3 | 1-3 | Presentation and Learning by Doing in the Lab | Assignment |
| July 29 – Aug 3, 2026 | C.A. Test - I | | | | | | |
| Aug 4 - 6, 2026 (Day Order 4 - 6) | 3 | Microbial Physiology 3.1 Microbial Nutrition, | K1-K4 | 2 | 1-3 | Presentation/ Lab demonstration | Test |

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|---------------------------------------|---|--|--------------------|------------|----------------|--|--|
| | | Types of Culture Media, Pure Culture Techniques, Preservation of Cultures 3.2 Microbial Growth- Growth Curve, Measurement of Growth-methods | | | | | |
| Aug 7 – 14, 2026 (Day Order 1- 6) | 3 | 3.3 Factors Influencing the Growth of Microorganisms – Temperature, pH, Osmotic pressure, Moisture, Radiations and Different Chemicals 3.4 Physical and Chemical Methods of Microbial Control | K3-K5 | 3 2 | 2-4 2-4 | Presentation/ demonstration Presentation | Lab Questionnaire Third Component Sterilization- 10 Marks |
| Aug 17 - 24, 2026 (Day Order 1- 6) | 4 | 3.4 Physical and Chemical Methods of Microbial Control Microbial Diseases 4.1 Medical Microbiology-Disease Transmission, Patterns and Spread of Infection | K3-K5 K1-K5 | 1 2 | 1-4 1-4 | Presentation / Model building Presentation | Test Presentation |

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| | | 4.2 Respiratory Tract Infection-Tuberculosis, Viral Influenza, Fungal Pneumonia | K1-K5 | 2 | 1-4 | Presentation | Third Component Seminar-Respiratory tract infections – 20 Marks |
| Aug 25 – Sep 2, 2026 (Day Order 1- 6) | 4 | 4.2 Respiratory Tract Infection-Tuberculosis, Viral Influenza, Fungal Pneumonia | K1-K5 | 2 | 1-4 | Presentation | Presentation |
| | | 4.3 Gastrointestinal Infection-Dysentery, Gastroenteritis | | 3 | 1-4 | | Presentation |
| Sep 3 – 11, 2026 (Day Order 1- 6) | 4 | 4.3 Gastrointestinal Infection-Dysentery, Gastroenteritis | K1-K5 | 1 | 1-4 | Presentation | Third Component |
| | | 4.4 Urinary Tract Infections – Leptospirosis, Sexually Transmitted Diseases – HIV, Syphilis | K1-K5 | 4 | 1-4 | Presentation | Seminar Gastrointestinal Infection - 20 Marks |
| | | | | | | | Group Discussion |

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| Sep 15-17, 2026 (Day Order 1 - 3) | 5 | Industrial Microbiology & Extremophiles 5.1 Microbial products- Bio-fertilisers, Bio-pesticides | K4-K6 | 3 | 3-5 | Presentation/ Model building | Group Discussion |
| Sep 18 –23, 2026 | C.A. Test – II | | | | | | |
| Sep 24 - 28, 2026 (Day 4 – 6) | 5 | 5.2 Industrial Production of Antibiotics – Streptomycin | K4-K6 | 2 | 3-5 | Presentation/ / Model building | Test |
| Sep 29 – Oct 7, 2026 (Day Order 1 - 6) | 5 | 5.2 Industrial Production of Antibiotics – Streptomycin | K4-K6 | 1 | 3-5 | Presentation/ Case studies | Test |
| | | 5.3 Extremophiles-habitant & Classification, Halophiles, Thermophiles, Alkaliphiles, Acidophiles | | 3 | | | |
| | | 5.4 Biotechnological applications of Extremophiles | K4-K6 | 1 | | | |
| Oct 8 - 14, 2026 | 5 | 5.4 Biotechnological | K4-K6 | 5 | 3-5 | Presentation/ Case | Test |

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| (Day Order 1 - 6) | | applications of Extremophiles | | | | survey | |
| Oct 15 - 21, 2026 (Day Order 1- 4) | REVISION | | | | | | |

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| STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI | | |
| COURSE PLAN (June - November 2026) | | |
| Department | : Biotechnology | |
| Name/s of the Faculty | : Dr. J.Anbumalarmathi | |
| Course Title | : Molecular Biology and Recombinant DNA Technology | |
| Course Code | : 23BY/PC/MR14 | |
| Shift | : II | |
| COURSE OUTCOMES (COs) | | |
| Cos | Description | CL |
| CO1 | understand and recall the basic concepts in molecular biology and recombinant DNA technology | K1, K2 |

| CO2 | apply the biological processes on the aspects of molecular biology | | | | | | K3 |
|---|--|---|---|--|--|--------------------------------------|---------------------------|
| CO3 | analyze the different types of vectors, molecular and cloning techniques | | | | | | K4 |
| CO4 | evaluate the applications of molecular biology, and recombinant DNA technology | | | | | | K5 |
| CO5 | formulate and execute research using molecular and cloning techniques | | | | | | K6 |
| | | | | | | | |
| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
| Jun 22, 2026 (Day Order 6) | | No Class | | | | | |
| Jun 23 – July 1, 2026 (Day Order 1- 6) | 1 | Cell Structure, Function and Genetic Material 1.1 Structure, Organization and Function of Cells – Prokaryotes and Eukaryotes 1.2 Plasma Membrane – | K1, K2 K2-K6 | 1 2 | 1 1-5 | Lecture: Powerpoint presentation | Group discussion |

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|---|------------|---|---------------------------------|---------------------|---------------------------|----------------------------------|------------------|
| | | Passive, Active transport 1.3 Cytoskeleton – Microfilaments, Intermediate Filaments and Microtubules | K3-K6 | 2 | 2-5 | | |
| July 2 – July 8, 2026 (Day Order 1- 6) | 1 2 | 1.4 Cell - Cell Communication – Mechanism and Types Replication, Repair and Protein Synthesis 2.1 DNA Replication - Prokaryotes and Eukaryotes 2.2 DNA Damage | K4-K6 K1-K3 K2-K5 | 2 2 1 | 3-5 1-2 1-4 | Lecture: Powerpoint presentation | Group discussion |
| July 9 – 16, 2026 (Day Order 1- 6) | 2 | 2.2 DNA Repair - Direct, Mismatch, Base-Excision, Nucleotide Excision 2.3 Protein Synthesis - Transcription and Translation – Prokaryotes | K2-K5 K2-K6 | 2 3 | 1-4 1-5 | Lecture: Powerpoint presentation | MCQ |

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| July 17 – 24, 2026 (Day Order 1- 6) | 2 | 2.4 Protein Synthesis - Transcription and Translation – Eukaryotes | K2-K6 | 4 | 1-5 | Lecture: Powerpoint presentation | Model building |
| | 3 | Gene Regulation 3.1 Transcriptional Regulation in Prokaryotes | K1-K5 | 1 | 1-4 | | |
| July 25 – 28, 2026 (Day Order 1- 3) | 3 | 3.1 <i>lac</i> and <i>trp</i> Operon, Transcriptional Regulation in Eukaryotes | K1-K5 | 4 | 1-4 | Lecture: Powerpoint presentation | Poster presentation |
| July 29 – Aug 3, 2026 | C.A. Test – I | | | | | | |
| Aug 4 - 6, 2026 (Day Order 4 - 6) | 3 | 3.2 Transcriptional Regulation in Eukaryotes – DNA Methylation and Histone Modification | K2-K5 | 1 | 1-4 | Lecture: Powerpoint presentation | Third component: Seminar presentation on transcriptional regulation in |

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|--|------------|--|-------|---|-----|----------------------------------|-------------------------|
| | | | | | | | eukaryotes- 25 Marks |
| Aug 7 – 14, 2026 (Day Order 1- 6) | 3 | 3.2 Protein Processing, Folding, Sorting and Transport | K2-K5 | 2 | 1-4 | Lecture: Powerpoint presentation | Case studies |
| | | 3.3 Regulation of Cell Cycle | K3-K5 | 3 | 2-4 | | |
| Aug 17 - 24, 2026 (Day Order 1- 6) | 3 4 | 3.4 Cancer and Apoptosis - Intrinsic and Extrinsic Pathways | K3-K6 | 4 | 2-4 | Lecture: Powerpoint presentation | Case studies |
| | | Vectors and Gene Cloning 4.1 Restriction Modification Systems - Types and Nomenclature | K1-K3 | 1 | 1-2 | | |
| Aug 25 – Sep 2, 2026 (Day Order 1- 6) | 4 | 4.1 Restriction Enzymes TYPE I, II, III, Enzymes Used in Recombinant DNA Technology | K1-K3 | 2 | 2-5 | Lecture: Powerpoint presentation | Group discussion |
| | | 4.2 Plasmid Vectors and their Properties, Vectors- pBR 322, pUC, M13 Vectors | K4-K6 | 3 | 3-5 | | |

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| Sep 3 – 11, 2026 (Day Order 1- 6) | 4 | 4.2 Phagemids, Shuttle Vectors 4.3 Genomic Library and cDNA Library Construction | K4-K6 | 1 4 | 3-5 | Lecture: Powerpoint presentation | MCQ |
| Sep 15-17, 2026 (Day Order 1 - 3) | 4 5 | 4.4 Marker Genes- Recombinant Selection and Screening Sequencing and Applications of rDNA Technology 5.1 DNA Sequencing, Polymerase Chain Reaction | K4-K6 K1-K6 | 4 1 | 3-5 1-5 | Lecture: Powerpoint presentation | Experiment |
| Sep 18 –23, 2026 | C.A. Test – II | | | | | | |
| Sep 24 - 28, 2026 (Day 4 – 6) | 5 | 5.1 Blotting Techniques | K1-K6 | 1 | 1-5 | Lecture: Powerpoint presentation | Experiment |
| Sep 29 – Oct 7, 2026 (Day Order 1 - 6) | 5 | 5.2 Molecular Markers and its Applications - RFLP, RAPD, SSR 5.3 CRISPR – Caspase Technology | K2-K6 K3-K6 | 2 3 | 1-5 2-5 | Lecture: Powerpoint presentation | Experiment Third component: |

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| | | | | | | | Assignment on CRISPR technology- 25 Marks |
| Oct 8 - 14, 2026 (Day Order 1 - 6) | 5 | 5.3 CRISPR – Caspase Technology 5.4 Applications of Recombinant DNA Technology in Vaccines, Gene Therapy | K3-K6 K5-K6 | 1 4 | 2-5 4-5 | Lecture: Powerpoint presentation | Group discussion |
| Oct 15 - 21, 2026 (Day Order 1- 4) | REVISION | | | | | | |

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN June - November 2026

Department : BIOTECHNOLOGY
Name of the Faculty : DR. ARUNA SHARMILI S
Course Title : FOOD BIOTECHNOLOGY
Course Code : 23BY/PE/FB15
Shift : II

COURSE OUTCOMES (COs)

| COs | Description | CL |
|------------|--|-----------|
| CO1 | define the biotechnological aspects of food | K1, K2 |
| CO2 | compute the food constituents for the food industry | K3 |
| CO3 | outline the importance of the food processing sector | K4 |
| CO4 | summarise the requirements of food safety | K5 |
| CO5 | develop innovative techniques for the food industry | K6 |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|---|----------|--|-----------------|----------------|------------|-------------------------------|-------------------------------|
| June 22, 2026 (Day Order 6) | 1 | Fundamentals of food science 1.1 Composition of food Carbohydrates, Protein, Fats, Water, Vitamins, Minerals, Antinutrients | K1-3 | 1 | 1-3 | Lecture | Group discussions |
| Jun 23 – July 1, 2026 (Day Order 1- 6) | 1 | Fundamentals of food science 1.1 Composition of food Carbohydrates, Protein, Fats, Water, Vitamins, Minerals, Antinutrients 1.2 Food Microbiology – Sources of Microorganisms | K1-3 K4-5 | 4 1 | 1-3 3-4 | Lecture | Group discussions |
| July 2 – July 8, 2026 (Day Order 1- 6) | 1 | Fundamentals of food science 1.2 Food Microbiology – Sources of Microorganisms 1.3 Factors Affecting Growth and Survival of Microorganisms in Foods - Intrinsic and Extrinsic Factors | K4-5 K4-6 | 3 2 | 3-4 3-5 | Power Point Presentation | Group discussions Quiz |
| July 9 – 16, 2026 (Day Order 1- 6) | 1 | Fundamentals of food science 1.4 Bacterial Toxins, Fungal Toxins, Food-Borne Intoxications | K4-6 | 3 | 3-5 | Power Point Presentation | Quiz |

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| | 2 | Food constituents 2.1 Food Texture-Brittleness, Chewiness, Gumminess, Oiliness, Greasiness | K1-6 | 2 | 1-5 | | |
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| Aug 4 - 6, 2026 (Day Order 3 - 6) | 2 | Food constituents 2.4 Functional Food – Oat Bran Fibre, Soy Protein, Fish Oil, Fatty Acids, Prebiotics-Probiotics Plant Sterols and Stanols | K1-6 | 1 | 1-5 | Power Point Presentation | Quiz |
| Aug 7 – 14, 2026 (Day Order 1- 6) | 3 | Food Processing and Adulteration 3.1. Cereals Pulses, Spices, Plantation Crop (Cashewnut, Coconut) | K1-6 | 5 | 1-5 | Power Point Presentation | Quiz |
| Aug 17 - 24, 2026 (Day Order 1- 6) | 3 | Food Processing and Adulteration 3.2 Fruits and Vegetables; Flesh foods- Meat, Poultry, Seafood 3.3 Food adulteration- Adulteration to Improve Physical and Sensory Properties | K1-6 K3-6 | 4 1 | 1-5 2-5 | Power Point Presentation | Group discussion |

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|--|---|---|--------------|--------|------------|--------------------------|--|
| Aug 25 – Sep 2, 2026 (Day Order 1- 6) | 3 | Food Processing and Adulteration 3.3 Food adulteration- Adulteration to Improve Physical and Sensory Properties 3.4 Food Substitution Organic and Synthetic Adulterants | K1-6 K1-6 | 3 2 | 1-5 1-5 | Power Point Presentation | Group Discussion |
| Sep 3 – 11, 2026 (Day Order 1- 6) | 4 | Food Preservation 4.1 Traditional Food Preservation Methods- Curing, Boiling, Sugaring, Pickling, Canning, Fermentation 4.2 Low- Refrigeration, Freezing, Cryopreservation High Temperature- Pasteurisation, Sterilisation, Ultra Heat Treatment | K1-6 K1-6 | 3 2 | 1-5 1-5 | Power Point Presentation | III Component Class activity – Preservation of food products and its display – 20 Marks |
| Sep 15-17, 2026 (Day Order 1 - 3) | 4 | Food Preservation 4.2 Low- Refrigeration, Freezing, Cryopreservation High Temperature- Pasteurisation, Sterilisation, Ultra Heat Treatment 4.3 Chemicals-Benzoates, Nitrates, Sulphites Biopreservation- Endolysins, Lactic Acid Bacteria | K1-6 K1-6 | 2 1 | 1-5 1-5 | Power Point Presentation | III Component- 4.3 Chemical |

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| | | | | | | | preservatives - Assignment 10 Marks |
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| Sep 18 –23, 2026 | C.A. Test - II | | | | | | |
|---|-----------------------|--|------|---|-----|---------|-------------------------------------|
| Sep 24 - 28, 2026 (Day 4 – 6) | 4 | 4.3 Chemicals-Benzoates, Nitrates, Sulphites Biopreservation- Endolysins, Lactic Acid Bacteria | K1-6 | 2 | 1-5 | Lecture | |
| Sep 29 – Oct 7, 2026 (Day Order 1 - 6) | 4 | 4.4 Non-thermal methods- High-pressure Processing, Pulsed Electric Field, Ultrasound, Pulsed Light, Ultraviolet Light, Irradiation | K1-6 | 3 | 1-5 | Lecture | Quiz |
| | 5 | 5.1 Introduction – Labels and Barcodes, Shelf life, E- number | K1-2 | 2 | 1-2 | | |
| Oct 8 - 14, 2026 (Day Order 1 - 6) | 5 | 5.2 Food Packaging Materials - Biodegradable and Non- degradable | K2-6 | 2 | 1-5 | Lecture | Display of Food Packaging Materials |
| | | 5.3 Packaging of Fresh and Processed Foods | K4-6 | 2 | 3-5 | | Seminar |

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| | 5.4 Quality Assurance – BIS, AGMARK, GMP, FSSAI, FDA, HACCP | K3-6 | 1 | 2-5 | | Quiz |
| Oct 15 - 21, 2026 (Day Order 1- 3) | REVISION | | | | | |

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : Biotechnology

Name/s of the Faculty : Dr. J. Anbumalarmathi

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|---------------------|----------------------|
| Course Title | : Bioinstrumentation |
| Course Code | : 23BY/PE/BI15 |
| Shift | : II |

COURSE OUTCOMES (COs)

| COs | Description | CL |
|------------|--|-----------|
| CO1 | recall the instrumentation used in biotechnological research | K1 |
| CO2 | discuss the basic concept of qualitative and quantitative analysis | K2 |
| CO3 | present the classification of bioinstruments | K3 |
| CO4 | outline construction, and working principle of various bioinstruments | K4-K5 |
| CO5 | summarize the applications of bioinstruments in different fields of research | K6 |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|-------------------------------|-----------------|---|------------------------|-----------------------|------------|--------------------------------------|---------------------------|
| Jun 22, 2026 (Day Order 6) | 1 | Microscopy and Spectroscopy 1.1 Microscopy- Cryomicroscopy | K1-K6 | 1 | 1-5 | Lecture: Powerpoint presentation | Group discussion |

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|---|----------------------|--|----------------|--------|------------|-------------------------------------|--|
| Jun 23 – July 1, 2026 (Day Order 1- 6) | 1 | 1.1 Confocal Microscopy 1.2 UV- Spectroscopy, FTIR | K1-K6 K1-K3 | 1 4 | 1-5 1-3 | Lecture: Powerpoint presentation | MCQ Learning by doing |
| July 2 – July 8, 2026 (Day Order 1- 6) | 1 | 1.3 Mass Spectroscopy, NMR | K2-K6 | 5 | 2-5 | Lecture: Powerpoint presentation | Group discussion |
| July 9 – 16, 2026 (Day Order 1- 6) | 2 | Molecular and Analytical Techniques 2.1 PCR, Sequencer | K1-K6 | 5 | 1-5 | Lecture: Powerpoint presentation | Seminar presentation |
| July 17 – 24, 2026 (Day Order 1- 6) | 2 | 2.2 FACS, Microarray | K1-K6 | 5 | 1-5 | Lecture: Powerpoint presentation | Third component: Assignment on Microarray- 25 marks |
| July 25 – 28, 2026 (Day Order 1- 3) | 2 | 2.3 Kjeldal Unit, Biosensors – Types and Applications | K3-K6 | 3 | 3-5 | Lecture: Powerpoint presentation | Case studies |
| July 29 – Aug 3, 2026 | C.A. Test – I | | | | | | |

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| Aug 4 - 6, 2026 (Day Order 4 - 6) | 3 | Separation Techniques 3.1 Centrifugation - Basic Principles of Sedimentation | K1-K4 | 1 | 1-4 | Lecture: Powerpoint presentation | Group discussion |
| Aug 7 – 14, 2026 (Day Order 1- 6) | 3 | 3.1 Types of Rotors, Preparative and Analytical Ultracentrifugation | K1-K4 | 4 | 1-4 | Lecture: Powerpoint presentation | MCQ |
| | | 3.2 Chromatography - TLC | K1-K4 | 1 | 1-4 | | Learning by doing |
| Aug 17 - 24, 2026 (Day Order 1- 6) | 3 | 3.2 Affinity Chromatography, Ion- Exchange Chromatography | K1-K4 | 1 | 1-4 | Lecture: Powerpoint presentation | Model building |
| | | 3.3 HPLC, Gas Chromatography | K4-K6 | 4 | 4-5 | | Group discussion |
| Aug 25 – Sep 2, 2026 (Day Order 1- 6) | 4 | Electrophoresis 4.1 Electrophoresis - Basic Principles, PAGE – Native and SDS | K1-K6 | 5 | 1-5 | Lecture: Powerpoint presentation | Experiment |
| Sep 3 – 11, 2026 (Day Order 1- 6) | 4 | 4.2 Agarose Gel Electrophoresis, 2- Dimensional Gels | K1-K4 | 5 | 1-4 | Lecture: Powerpoint presentation | Experiment |

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| Sep 15-17, 2026 (Day Order 1 - 3) | 4 | 4.3 DGGE, Microchip Electrophoresis | K3-K6 | 3 | 3-5 | Lecture: Powerpoint presentation | Third component: Poster presentation on DGGE-25 marks |
| Sep 18 –23, 2026 | C.A. Test – II | | | | | | |
| Sep 24 - 28, 2026 (Day 4 – 6) | 5 | Radiation and Preservation Techniques 5.1 Measurement of Radioactivity in Biological Sample- Gas Ionization (GM counter), Scintillation Counter | K1-K6 | 2 | 1-5 | Lecture: Powerpoint presentation | Group discussion |
| Sep 29 – Oct 7, 2026 (Day Order 1 - 6) | 5 | 5.1 Safety Aspects in Handling Radioactive Isotope 5.2 Biological Applications of Radioisotopes | K1-K6 K1-K6 | 1 4 | 1-5 1-5 | Lecture: Powerpoint presentation | Group discussion |
| Oct 8 - 14, 2026 (Day Order 1 - 6) | 5 | 5.3 Lyophilization - Types, Spray Dyer | K3-K6 | 5 | 3-5 | Lecture: Powerpoint presentation | Learning by doing |

Oct 15 - 21, 2026
(Day Order 1- 4)

REVISION